Chapter Test

ACHIEVEMENT CHART				
Category	Knowledge / Understanding	Thinking / Inquiry / Problem Solving	Communication	Application
Questions	**All**	**4, 7, 8**	**1, 3, 8**	**3, 4, 5, 6, 8**

1. Natasha tosses four coins one after the other.

a) In how many different orders could heads or tails occur.

b) Draw a tree diagram to illustrate all the possible results.

c) Explain how your tree diagram corresponds to your calculation in part a).

2. Evaluate the following by first expressing each in terms of factorials.

a) ${}_{15}P_6$ **b)** $P(6, 2)$ **c)** ${}_{7}P_3$

d) ${}_{9}P_9$ **e)** $P(7, 0)$

3. Suppose you are designing a remote control that uses short, medium, or long pulses of infrared light to send control signals to a device.

a) How many different control codes can you define using

i) three pulses?

ii) one, two, or three pulses?

b) Explain how the multiplicative and additive counting principles apply in your calculations for part a).

4. **a)** How many four-digit numbers can you form with the digits 1, 2, 3, 4, 5, 6, and 7 if no digit is repeated?

b) How many of these four-digit numbers are odd numbers?

c) How many of them are even numbers?

5. How many ways are there to roll either a 6 or a 12 with two dice?

6. How many permutations are there of the letters of each of the following words?

a) data **b)** management **c)** microwave

7. A number of long, thin sticks are lying in a pile at odd angles such that the sticks cross each other.

a) Relate the maximum number of intersection points of n sticks to entries in Pascal's triangle.

b) What is the maximum number of intersection points with six overlapping sticks?

ACHIEVEMENT CHECK			
Knowledge / Understanding	Thinking / Inquiry / Problem Solving	Communication	Application

8. At a banquet, four couples are sitting along one side of a table with men and women alternating.

a) How many seating arrangements are possible for these eight people?

b) How many arrangements are possible if each couple sits together? Explain your reasoning.

c) How many arrangements are possible if no one is sitting beside his or her partner?

d) Explain why the answers from parts b) and c) do not add up to the answer from part a).